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THE GOSSAMER SPIDER.*

BY DR. G. LINCEUM.

DECEMBER is, in Texas, the month for ballooning spiders to emigrate. Webster says, "gossamer, a fine, filmy substance like cobwebs floating in the air, in calm, clear weather, especially in autumn, and is probably formed by a species of spider." Pretty good for a dictionary maker. But he didn't know how it happened to be floating in the air.

Sure enough, that fine, filmy substance is formed by a little spider. I have seen them making it. It is a balloon, and if Webster had caught one of those floating locks of gossamer before it reached a landing place, he would have found the little aeronaut and half a dozen young ones aboard of it. The balloon is the plan adopted by that particular species of *Arachnidæ*, to scatter widecast its young ones.

This species of spider constructs nets and snares, and, like many other species of the family, its net is circular, very regularly and systematically constructed, and thoughtfully placed in an open passage way, seven or eight feet from the ground between two bushy trees, and above the contingency of being broken by a roaming cow or loose horse.

In setting and establishing the two first brace lines between the two trees it has selected for its net, it displays much sagacity and ingenuity, with a thorough knowledge of the powers of the wind, and the best possible method and position to avail itself of its uses. Climbing up the tree situated to the windward, it takes position, at the proper elevation on the point of the longest twig it can find that projects towards the other tree of its selection; and spinning one of its gossamer webs of the proper length, patiently waits for a breath of air to waft it across the vacant space of ten to twenty feet and lash its viscid extremity to some projecting twig or leaf of the opposite tree. It holds the line in its hand, feels when it strikes, and instantly making the home end fast, strikes out boldly on the microscopic thread; lets go another thread as she travels, and is soon observed lashing down the ends

* Communicated by the author to the Smithsonian Institution and published by permission of Prof. Henry.

of the now double line, to a twig of the other tree. This done, it runs back and forth on it, spinning a thread every trip until the line is ten or fifteen ply.

It now places itself on another twig of the windward tree, as nearly under the first line as possible and six or eight feet below, lets go another thread. As soon as it feels it has caught on the opposite tree it fastens down the home end, and hastens to reenact all we saw it perform on the first line. It seems to be much elated and encouraged by its successes, and, now hurriedly, is seen climbing up the first tree, and very soon is engaged at work as near the middle of the upper line, as could have been obtained by actual measurement. Soon it is observed descending spinning out a thread as it goes, it being safely fastened to the upper line. It swings down until it is somewhat below the lower line; but finds that the thread it hangs on, is half a yard or more to one side of its lower line. It now, after a moment's reflection, attempts to swing, pendulum-like, at the end of its thread to and from the lower line. The spider soon ascertained that success did not lie in that experiment; and wound up the thread it was hanging on until it regained its position on the middle of the upper line. It was very nearly calm, and it rapidly spun out a long wet thread, which, light as was the breeze, passed above the lower brace line. It was however continuously extended until it struck amongst the brush some distance away. The ingenious little workman continued to spin out the thread, until the slack of it bending down came in contact and adhered to the lower line. Feeling the entanglement, it immediately ran down, cut and cast loose the surplus end of the thread, carried the end in hand to a point at right angles with the attachment to the line above, made it fast, then quickly ran about a yard along the lower brace, attached a thread, returning, ran up the middle line, thence along the upper brace to a point perpendicular to where it had attached the thread in hand to the lower brace, drew up the slack and made it fast. Then passing on the upper brace to a point about a yard beyond the middle dropped line, made a thread fast and returning descended the middle line, carrying the thread to a point at right angles with its attachment above, and giving it the proper tension, made it fast. And now, laying three or four threads on each of these three stay lines, the balance of the work, though tedious, was easily accomplished.

After laying the radiating lines, it goes down to the centre, and carefully measuring with its right hind leg, seizes with its foot one of the lines, and drawing it down forcibly, until it touches the web vent; it adheres and is instantly let go. In its recoil, there is seen to be drawn out a milk like substance; this lessens into a very fine web which instantly dries. It then moves onwards to the next line and with the same hind foot seizes it at the proper measurement, draws it down as before until it touches the web fount, lets it recoil and spin out the gossamer web; and so on, from line to line, measuring the meshes exactly the same distance moving to the left; the circular line is put on spirally.

The gossamer spider will weigh near two grains; it is well formed, of a grayish pea green, the legs rather long. Quick in its movements, but a little timid; it will drop its work and run on the approach of a stranger. One species of mud dauber destroys multitudes of the gossamer spiders.

When, in the last days of November there comes a clear day, temperature 60° Fah. wind gently from the south; at about one o'clock, P. M., and afterwards during the succeeding three hours, may be seen, in this latitude at various heights and distance, very many white locks of gossamer floating smoothly in the air, all going with the wind. These are the balloons of the gossamer spider. And there is a mother and half a dozen or more young spiders aboard of every one of them.

Each balloon is furnished with two long lines at the forward end, which may be seen, waving and flapping in the wind as they fly, and seeming to aid in preserving the equable position of the light floating craft.

Towards four o'clock, P. M., the spectator will observe that the balloons are beginning to descend; and at the same time he will see great numbers of long glittering webs, detached and floating at random all rising higher as they go on with the wind.

Meanwhile the balloons with their freight are whirling, not very rapidly downwards, until they strike some tall weed or grass, when they become entangled, and the passengers instantly leap out, and spinning out a web swing themselves down to the ground.

If the observer is near enough when the balloon strikes he can see all this.

I have noticed these balloons, when the wind was brisk passing very rapidly, at an altitude of one or two thousand feet. There

is no telling where they came from or how far they might float. 150, or 200 miles perhaps. Thus is scattered the species over vast districts, which, no doubt, is the object of their aeronautic journey.

When they intend to make an ascension, they fix themselves on some extreme point of the branch of a tree, or weed or corn tassel; there carefully spin out a lock of white gossamer five or six inches long and two inches wide in the middle, tapering towards the ends; holding it all the time in the gentle breeze by a thread two or three inches long, which, being attached to the end of the selected point, detains the balloon until it is finished. They then spin out at the bow two lines thirty or forty feet in length, another at the stern twenty or thirty feet long, then cut the cable and float briskly upwards and forwards on an inclined plane.

I once observed one of these spiders at work on the upper corner of an open, outside door shutter. She was spinning gossamer, of which she was forming a balloon; and clinging to her thorax was a little cluster of minute, young spiders. She finished up the body of the balloon; threw out the long bow lines, which were flapping and fluttering on the now gently increasing breeze, several minutes before she got all ready for the ascension. She seemed to be fixing the bottom and widening her hammock-shaped balloon. And now the breeze being suitable, she moved to the cable in the stern, severed it, and her craft bounded upwards and soaring away northwards, was soon beyond the scope of my observation. I was standing near when it was preparing to cast loose the cable; and had thought I would arrest its flight but it bounded away with such a sudden hop, that I missed and it was gone.

ON THE NESTING OF CERTAIN HAWKS, ETC.

BY DR. ELLIOTT COUES, U. S. A.

IN a recent number of the *NATURALIST* I gave some account of the nidification of Swainson's buzzard (*Buteo Swainsoni*), but had nothing to say of the eggs, as I took the field last season too late for them. The present year I have secured numerous sets, and